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Lower York L. Ontario



Ministry of the Environment Ontario

WATER AND SEWAGE
SYSTEMS

Central York—Pickering Areas

WATER AND SEWAGE SYSTEMS

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MINISTRY
OF THE
ENVIRONMENT
ONTARIO

CENTRAL YORK - PICKERING AREAS

WATER
AND
SEWAGE
SYSTEMS

PROJECT DEVELOPMENT BRANCH

JUNE, 1972

PROJECT NOS.
1-0106-67
5-0039-67

BACKGROUND

The following summary outlines, in chronological order, the involvement of the Ontario Water Resources Commission and recently the Ministry of the Environment in the development of projects relative to the provision of major water and sewage works to service the area immediately north and east of the Municipality of Metropolitan Toronto.

In 1965, realizing the potential development in the area would likely create problems with respect to the availability of water and sewage services, the OWRC undertook an evaluation of the ground water sources and the long-term capabilities of the Humber, Don and Rouge Rivers as receiving streams.

The basic conclusions of these studies were:

1. No further upstream sewage treatment plants should be permitted on the Humber, Don and Rouge Rivers;
2. Ground water is not available in sufficient quantities to accommodate the expected growth in the southern portions of the study area;

3. The Metropolitan Toronto water supply system should be extended to serve the area north of Metropolitan Toronto; and
4. A trunk sewer system should be provided to direct sewage flows from the study area north of Metropolitan Toronto to a sewage treatment plant east of Metropolitan Toronto on the shore of Lake Ontario.

These conclusions established the basic criteria for all subsequent water and sewage studies undertaken by the Commission.

In 1966 the Commission engaged the consulting engineering firm of Gore & Storrie Limited to prepare an engineering report on the water and sewage servicing requirements of the areas adjacent to Metropolitan Toronto included within the watersheds of the Humber, Don and Rouge Rivers.

The Gore & Storrie report was completed in mid 1967 and outlined a system of water and sewage works, together with capital costs.

In October of 1969 a proposal was presented to senior officials of the affected municipalities. This

proposal was submitted on the basis that water and sewage services would be provided to the study area based on Provincially-financed systems with the recovery of costs on a user basis. This necessitated a finalization of area planning and population projections.

In 1970 the Province released a report entitled Design for Development, the Toronto-Centred Region which established the basis of overall planning for the area.

On January 1, 1971, the Regional Municipality of York was formed.

In August of 1971 a further report entitled A Status Report on the Toronto-Centred Region was released by the Ontario Government. This report provided target population figures for the Central York and southwest Pickering Areas. Direct reference to the report best defines our present status.

"On the basis of these population allocations the Ontario Water Resources Commission has been instructed to explore the possibilities and costs of a major servicing scheme in the Central York area."

Subsequently, Gore & Storrie were appointed to revise their previous report on the basis of the target population figures provided by the Government and to submit their report early in 1972.

In March 1972 the Federal and Provincial Governments announced the site of a new airport to be located in Pickering Township, together with a development complex of some 150,000 to 200,000 people.

Gore & Storrie were instructed to integrate these servicing requirements into their proposed servicing programme.

This proposal includes servicing recommendations for the complete study area in the Regional Municipality of York, the Township of Pickering, the Town of Ajax, the Village of Pickering, the North Pickering Community Development Project and the Airport.

Conclusions

The development of these projects over the last seven years has been delayed several times. This has led to a continuously mounting pressure for urban serviced land in the area. The projects were originally proposed to

resolve difficult servicing problems in the Central York Area. Realizing their significance, the Government directed that the projects be co-ordinated with the Provincial development concept for the area and also with the development of the new airport. It must be emphasized therefore that these projects can no longer be considered as the proposals of a single Ministry of the Government but rather as major Provincial undertakings which will in fact materially reduce major sources of pollution from urban watercourses, direct growth and development as intended in the Toronto-Centred Region concept both north and east of Metropolitan Toronto, materially reduce the pressures on Metropolitan Toronto for housing, facilitate the servicing of the new airport complex east of Metropolitan Toronto, and finally, as originally intended, resolve the difficult servicing problems in the Central York Area.

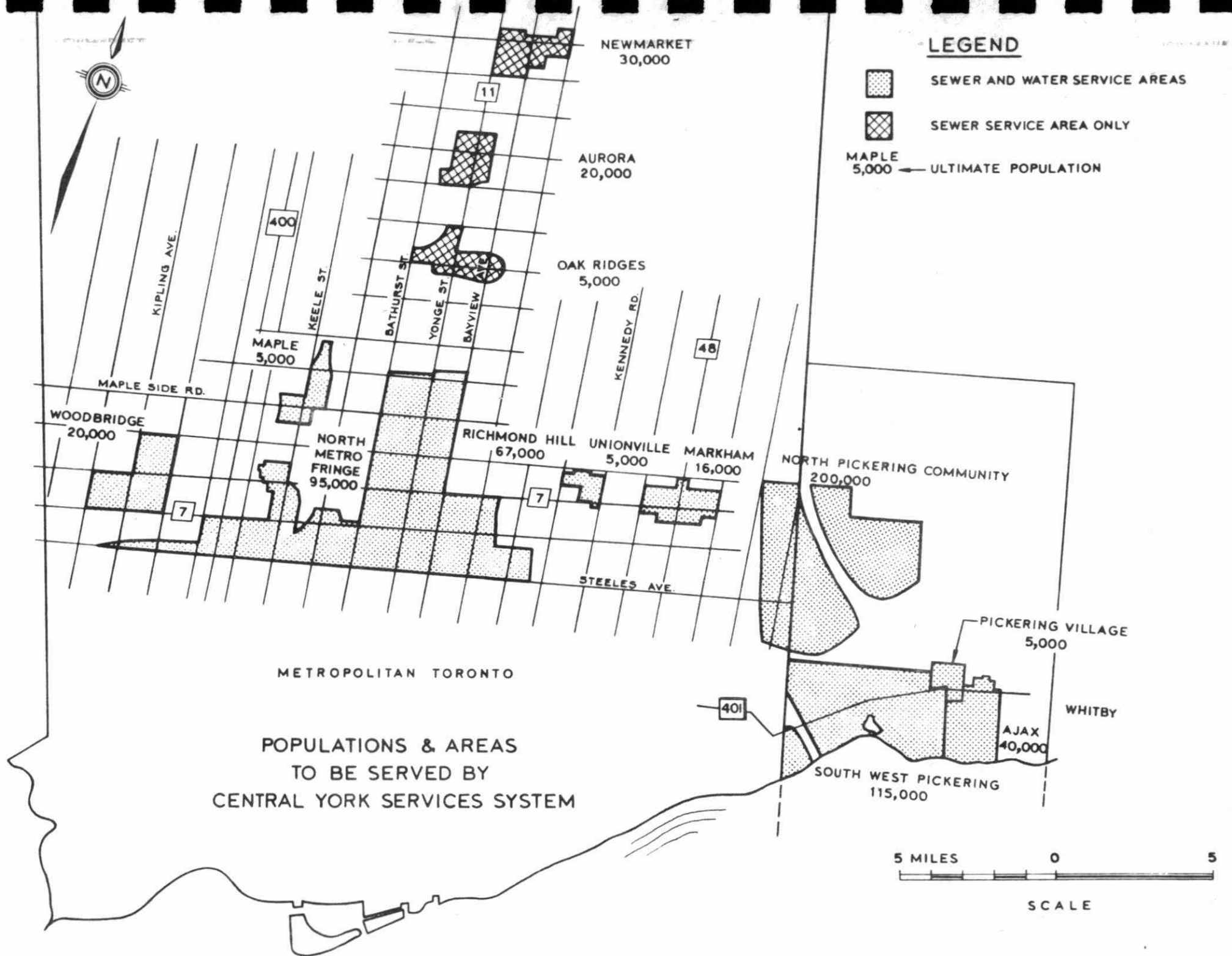


TABLE I

Population Projections for Intermediate Years

	<u>1970</u>	<u>1975</u>	<u>1980</u>	<u>1985</u>	<u>1990</u>	<u>1995</u>	<u>Ultimate</u>
Newmarket & Aurora	29,000	32,020	35,300	39,100	43,070	46,300	50,000
Richmond Hill	28,000	33,100	39,000	46,100	54,400	60,400	67,000
Markham Unionville	10,000	11,500	13,200	15,000	17,200	19,000	21,000
North Metro Fringe	16,000	22,100	30,000	41,300	57,000	73,600	95,000
Southwest Pickering	23,000	30,600	40,700	54,300	72,300	91,200	115,000 //
Maple	1,200	1,520	1,930	2,450	3,100	4,000	5,000
North Pickering Community Develop- ment Complex	-	-	7,500	25,000	70,000	125,000	200,000 //
Woodbridge	2,500	3,500	4,900	7,100	10,000	14,500	20,000
Oak Ridges	4,700	4,750	4,760	4,800	4,850	4,900	5,000
Ajax	12,000	14,430	17,230	21,430	26,580	32,900	40,000
Pickering Village	<u>2,500</u>	<u>2,780</u>	<u>3,080</u>	<u>3,420</u>	<u>3,800</u>	<u>4,200</u>	<u>5,000</u>
TOTAL	128,900	156,300	197,600	260,000	362,300	476,000	623,000

BASIS OF PROPOSAL

(a) Area of Study

These proposals are submitted on the basis of water and sewage services for the areas as more specifically set out in the body of the brief and as shown in Figure No. I.

(b) Population

The current and projected populations for the urban and industrial areas to be serviced are shown in Table I.

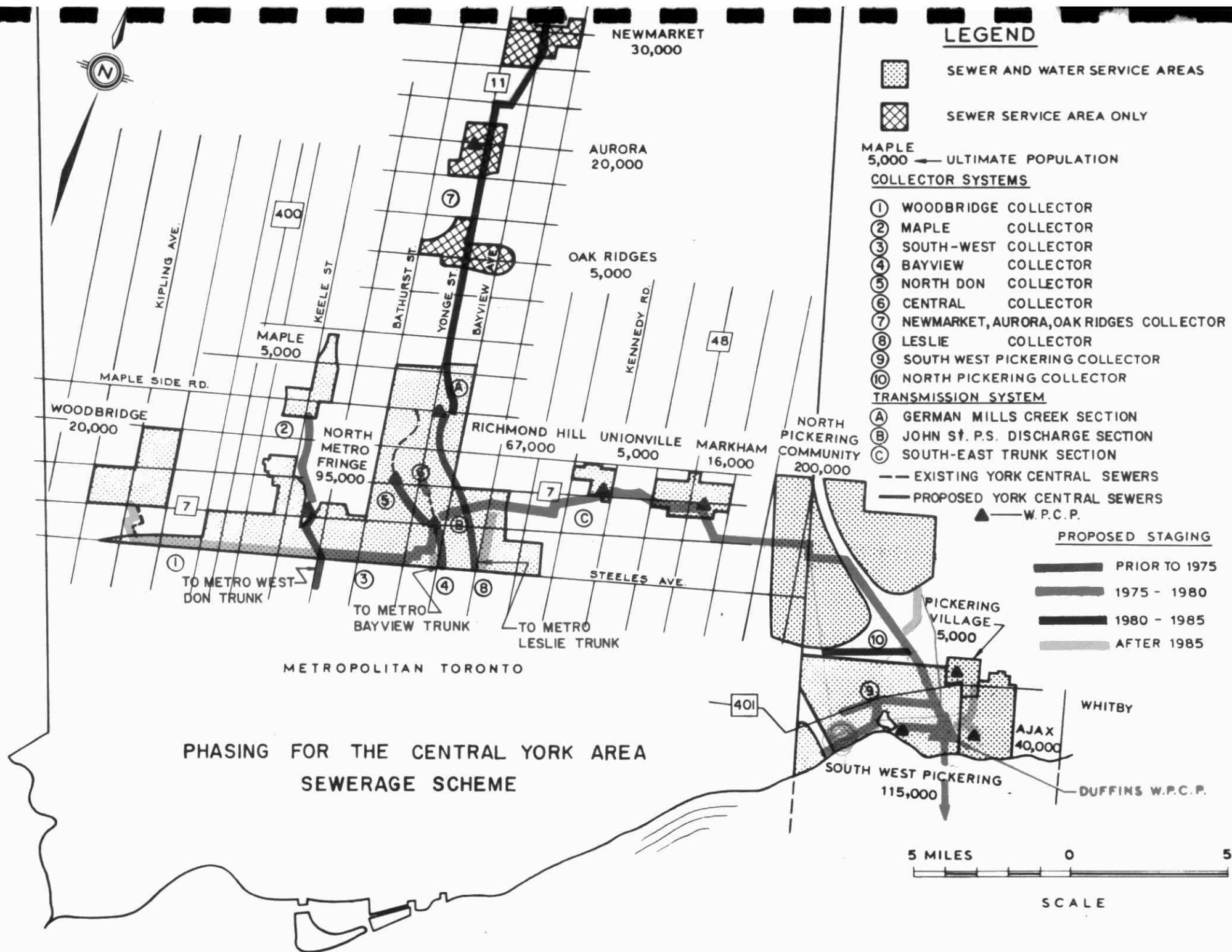
(c) Sewage Proposal

It is proposed that all sewage from local sanitary sewer systems in each urban node be collected by means of a trunk sewer system consisting of pumping stations, forcemains, gravity sewers and tunnels directing the total flow to a water pollution control plant to be located in the Township of Pickering in the vicinity of Duffin's Creek and discharging fully treated effluent to Lake Ontario.

(d) Water Proposal

It is proposed that water be supplied from the Metropolitan Toronto system by the following methods:

- (i) Direct connections to the Metropolitan Toronto system of trunk mains where adequate pressure is available to meet the requirements of the local needs.
- (ii) A system of pumping stations, reservoirs and trunk supply mains serving an urban node at service pressure.



S E W A G E W O R K S

(a) Existing Conditions

(i) Central York

At present, there are eight sewage treatment plants located north of Steeles Avenue. Six plants discharge treated sewage effluent to small watercourses that flow through Metropolitan Toronto to Lake Ontario. Two flow northerly to Lake Simcoe.

(ii) Pickering Area

At present, there are three sewage treatment plants located east of Metropolitan Toronto ultimately discharging treated sewage effluent to Lake Ontario.

(b) Construction Programme

It is proposed to construct the system in stages to provide for; -

- (i) Immediate relief in those areas where overloading of existing facilities is greatest.
- (ii) Minimization of capital expenditure during the early years when population is low in relation to ultimate.

(c) Capital Works

(i) Stage I (1973-75)

Initial works in Central York north of
Metropolitan Toronto to provide for; -

- continuance of Woodbridge sewage service
into Metropolitan Toronto
- elimination of treatment of sewage at the
West Don plant in the Town of Vaughan
- elimination of the treatment of sewage at
the Richmond Hill sewage treatment plant and
a minor expansion of service in Richmond Hill
and southwest Markham
- continuance of service in the lower Bayview
and Leslie areas to Metropolitan Toronto
- continuance of the use of the existing
sewage treatment plants at Newmarket, Aurora,
Unionville, Markham, Village of Pickering,
Ajax and Township of Pickering
- acquisition of all affected existing sewage
treatment works
- acquisition of property required for new
construction

The total estimated cost for Stage I is
\$7,965,000.

(c) Capital Works

(ii) Stage II (1975-80)

- discontinuance of discharge of sewage flow to the Metropolitan Toronto system except for the flows at Woodbridge and limited flows from the southwest portion of the Town of Markham immediately north of Steeles Avenue
- construction of a 25 M.G.D. water pollution control plant near the mouth of the Duffin's Creek
- construction of the main trunk sewer connected to the water pollution control plant
- construction of the southwest Pickering collector trunk sewer
- discontinuance of the Township of Pickering sewage treatment plant

These works will provide full outlet capacity for; -

- Maple
- southeast areas in the Town of Vaughan
- Richmond Hill

-
- Unionville and Markham
 - first stage of the Airport and North
Pickering Community Development Project
 - southwest area of Pickering
 - continuance of the existing water pollution
control plants at Newmarket, Aurora, Village
of Pickering and Town of Ajax

The total estimated cost for Stage II is
\$47,200,000.

(c) Capital Works

(iii) Stage III (1980-85)

- Stage III works provide for; -
- elimination of sewage treatment plants
at Aurora and Newmarket
 - full outlet capacity for Newmarket, Aurora
and Oak Ridges
 - provision for Stage II of the North
Pickering Community Development Project
by the installation of the Petticoat Creek
basin collector

The total estimated cost for Stage III is
\$6,200,000.

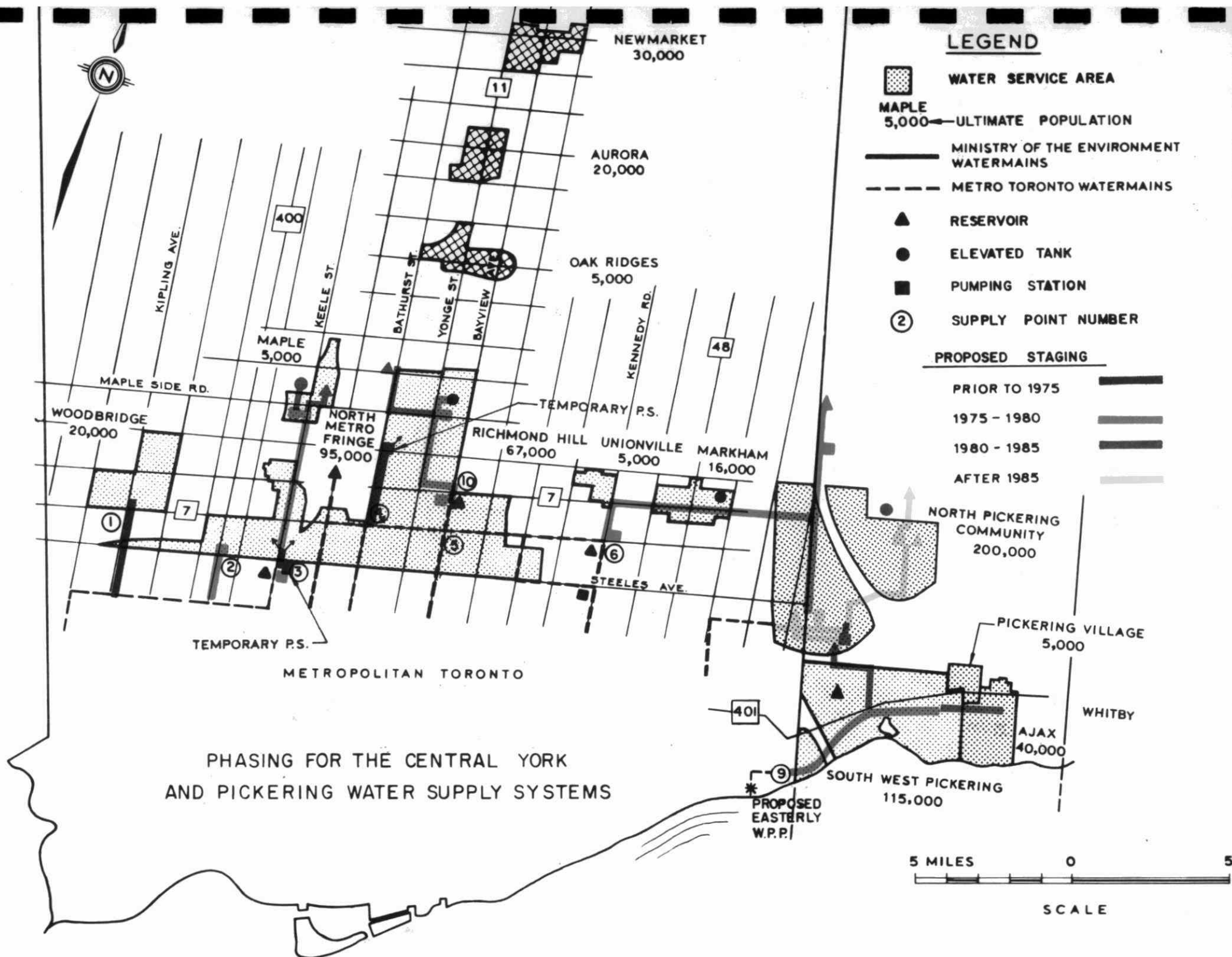
(c) Capital Works

(iv) Stage IV (1985-94)

Stage IV provides for; -

- completion of the system and removal of all sewage from the Metropolitan system by re-direction and treatment at the Duffin's Creek plant
- provision for Stage III of the North Pickering Community Development Project and construction of the Duffin's Creek collector sewer
- discontinuance of the Village of Pickering and Town of Ajax sewage treatment plants by the construction of a trunk collector sewer
- discontinuance of sewage from Woodbridge and the North Metro Fringe adjacent to Bayview Avenue and Leslie Street just north of Steeles Avenue
- expansion of the Duffin's Creek plant as necessary

The estimated cost to the year 1994 is \$29,000,000.



W A T E R W O R K S

(a) Existing Conditions

(i) Central York

The existing development in the Central York Area is supplied with ground water. The total well supply capacity existing is approximately 15 M.G.D. The raw water is very hard, high in alkalinity and in some cases contains excessive amounts of iron.

(ii) Pickering Area

The existing development in southwest Pickering is presently supplied from a 3.75 M.G.D. water purification plant on the north shore of Lake Ontario at the south end of Brock Road. Ajax and the Village of Pickering are supplied from a 5 M.G.D. water purification plant located on the north shore of Lake Ontario near the foot of Harwood Avenue South.

(b) Construction Programme

It is proposed to construct the system in stages to provide for; -

- (i) Immediate relief in those areas where supply from existing facilities is inadequate.

- (ii) Minimization of capital expenditures during the early years by a combination of new facilities and utilization of existing works where capacity is known to exist.

(c) Capital Works

(i) Stage I (1973-75)

Stage I works provide for the construction of immediate facilities in Central York to provide for; -

- Woodbridge, Highway 400 and Steeles Avenue areas
- Maple area
- portions of North Metro Fringe
- southwest Richmond Hill area
- acquisition of all affected existing works
- acquisition of property for new construction

The total estimated cost for Stage I is \$5,590,000.

(ii) Stage II (1975-80)

Stage II provides for the capital works to assure a water supply to all existing development in Central York, southwest Pickering and Stage I of the

North Pickering Community Development Project.

Existing ground water sources will be phased out of operation during this period. The Towns of Newmarket and Aurora, as well as the Community of Oak Ridges, will not be serviced from Metropolitan Toronto.

The total cost for Stage II is \$16,350,000.

(c) Capital Works

(iii) Stage III (1980-85)

Stage III provides additional works to complete the water supply system for Central York and to extend a supply to the Town of Ajax. During this stage, additional facilities are added for the North Pickering Community Development Project.

The total cost for Stage III is \$10,550,000.

(iv) Stage IV (1985-94)

Stage IV provides the ultimate supply works to complete the servicing of the North Pickering Community Development Project. The Pickering and Ajax water purification plants can be phased out of operation in this stage.

The total cost of Stage IV is \$5,000,000.

BASIS OF ANALYSIS

(a) Capital Costs (Summary)

(i) Sewage Works

STAGE I	\$ 7,965,000
STAGE II	47,200,000
STAGE III	6,200,000
STAGE IV	<u>29,000,000</u>
TOTAL	<u>\$90,365,000</u>

(ii) Water Works

STAGE I	\$ 5,590,000
STAGE II	16,350,000
STAGE III	10,550,000
STAGE IV	<u>5,000,000</u>
TOTAL	<u>\$37,490,000</u>

The financial analysis has been undertaken for the 20-year period beginning in 1975 and ending in 1994. Construction costs are based on current estimates (1972 dollars).

(b) Acquisitions

An allowance of eight million dollars (\$8.0 million) has been included in the financial analysis of the service rates for the assumption of

that portion of the applicable debt for the existing water pollution control and water production, treatment and storage facilities now the responsibility of the Regional Municipality of York, the Township of Pickering, the Village of Pickering and the Town of Ajax.

Local water distribution works and sub-collector systems for sewage will remain the responsibility of the respective existing authorities.

(c) Population, Water and Sewage Flows

The analyses are based on the following population projections and water usage.

(i) Sewage Works

	<u>1975</u>	<u>1985</u>	<u>1994</u>
Population Served	116,030	260,000	456,790
Daily Flow (M.G.)	11.6	28.6	54.3
* Per Capita Flow (gpcd)	100.0	110.0	119.0
Annual Flow (M.G.)	3,900	10,615	20,900

* Allowance for infiltration included.

(ii) Water Works

	<u>1975</u>	<u>1985</u>	<u>1994</u>
Population Served	119,530	216,100	406,240
Daily Flow (M.G.)	9.5	21.6	48.0
Per Capita Flow (gpcd)	80.0	100.0	118.0
Annual Flow (M.G.)	3,460	7,880	17,500

(d) Operating Cost

The financial analyses are related to all of the works being completely owned and operated as Provincial works under the Ontario Ministry of the Environment and the proposed rates include amortization of capital expenditures at current rates of interest, together with all operating expenses.

(e) Financial Assistance

The proposed rates include financial assistance by the Province of Ontario in an amount of approximately 15 per cent of the gross capital cost of Stage I and Stage II.

(f) Proposed Rates

(i) Sewage Service

The proposed rate for sewage service is 65 cents per 1,000 gallons.

(11) Water Service

The proposed rate for water service is
31 cents per 1,000 gallons exclusive of any charges
related to the cost of purchasing water from the
Municipality of Metropolitan Toronto.

CONDITIONS OF AGREEMENT

The financial proposals are on the basis of full participation by all municipalities for both water and sewage services. The rates are based on the expected population projections and unit rates of water consumption and sewage flow as listed.

The proposed agreements between the municipalities and this Ministry for water and sewage services will provide for rate revisions at specific periods which will allow any adjustment in rate that may be necessary due to variations in the capital costs, cost of operation and future construction programmes.

Subject to limitations imposed by planning authorities, each of the municipalities shall supply to the Ministry each year a report related to the municipality's requirements for water and sewage services for the subsequent three-year period. Subject to the condition noted, the Ministry will attempt to provide water and sewage services sufficient to meet the three-year requirements as specified in the reports by the municipalities.

FUTURE DEVELOPMENT OF PROGRAMMES

If the municipalities, after reviewing the proposals presented in this brief, agree in principle with the concept, the Ministry will prepare a form of agreement and submit it together with supporting financial information to the individual municipalities for further action.

Subsequent to the form of agreement being satisfactory, the municipalities must then establish the method by which the annual charges to the Ministry are to be recovered. The associated by-laws, together with by-laws authorizing the execution of an agreement with the Ministry will then constitute application to the Ontario Municipal Board which will be made directly by the Ministry. The approval of the Board will authorize the execution of the agreement between the Ministry and the municipalities and subject to receiving the approval of the Provincial Cabinet and formal execution of the agreement, the work will be placed under final design.